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AGS DIVISION TECHNICAL NOTE

No. 154

H5 BEAM KICKER NOSE BUMP AND COIL POSITION DETERMINATION

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A series of computer relaxation calculations were run to determine an acceptable nose coil position and nose bump configuration of the planned H5 kicker.

The computer program used was an adaptation of a relaxation program written previously by the author to handle electrostatic problems. This adaptation treats the field as a scale potential and is limited to the case of thin coils and infinite permeable cores.

The results are shown in the following figures.

Figure 1 shows the effect of raising the noise coil away from the gap edge. The fringing flux adds to the total flux and as a result increased the inductance with resulting increases in driving voltage. The integral under the curves of Figure 1 yield total flux and thus the inductance of the H5 kicker. Results are summarized in Table I.
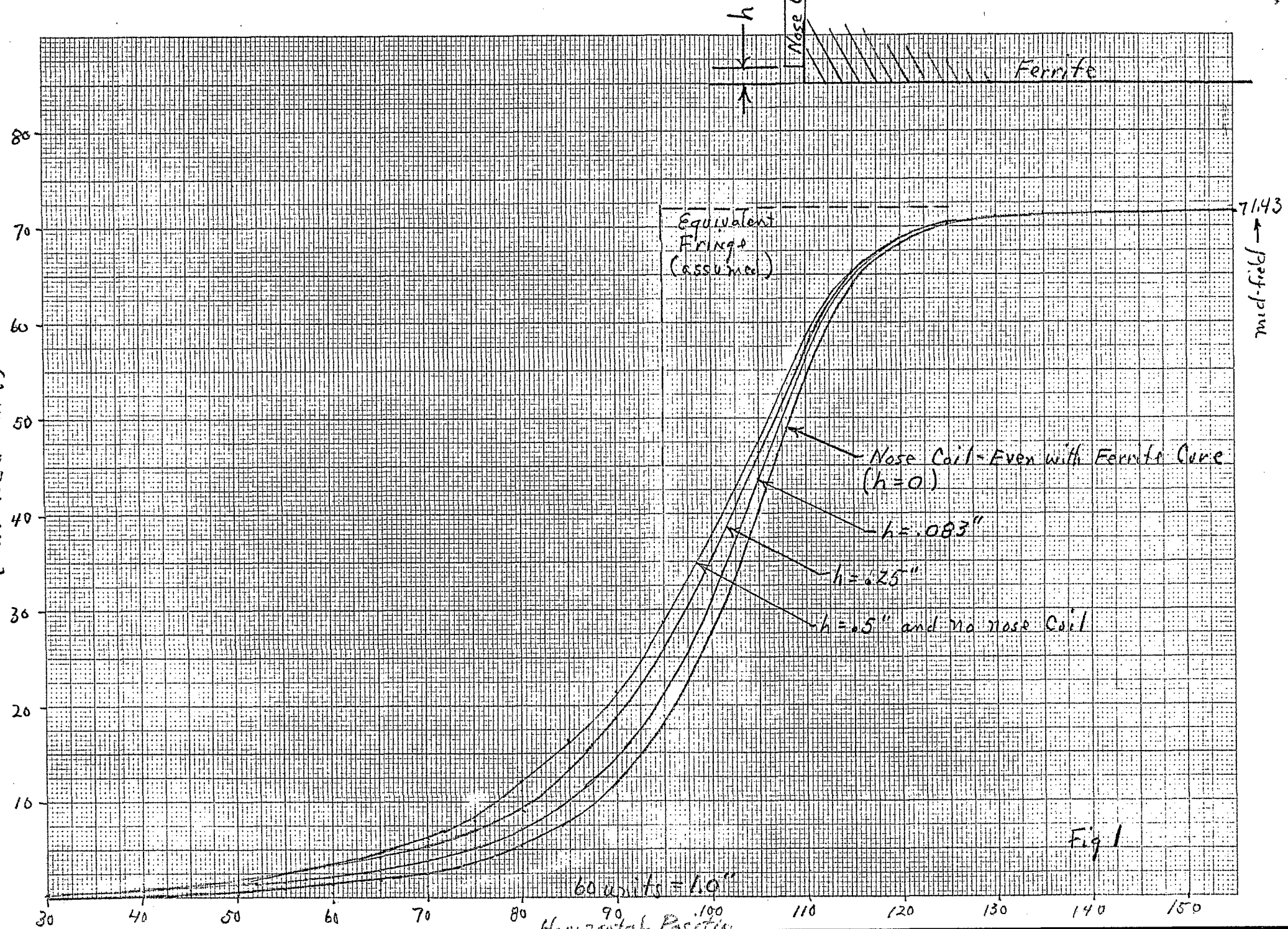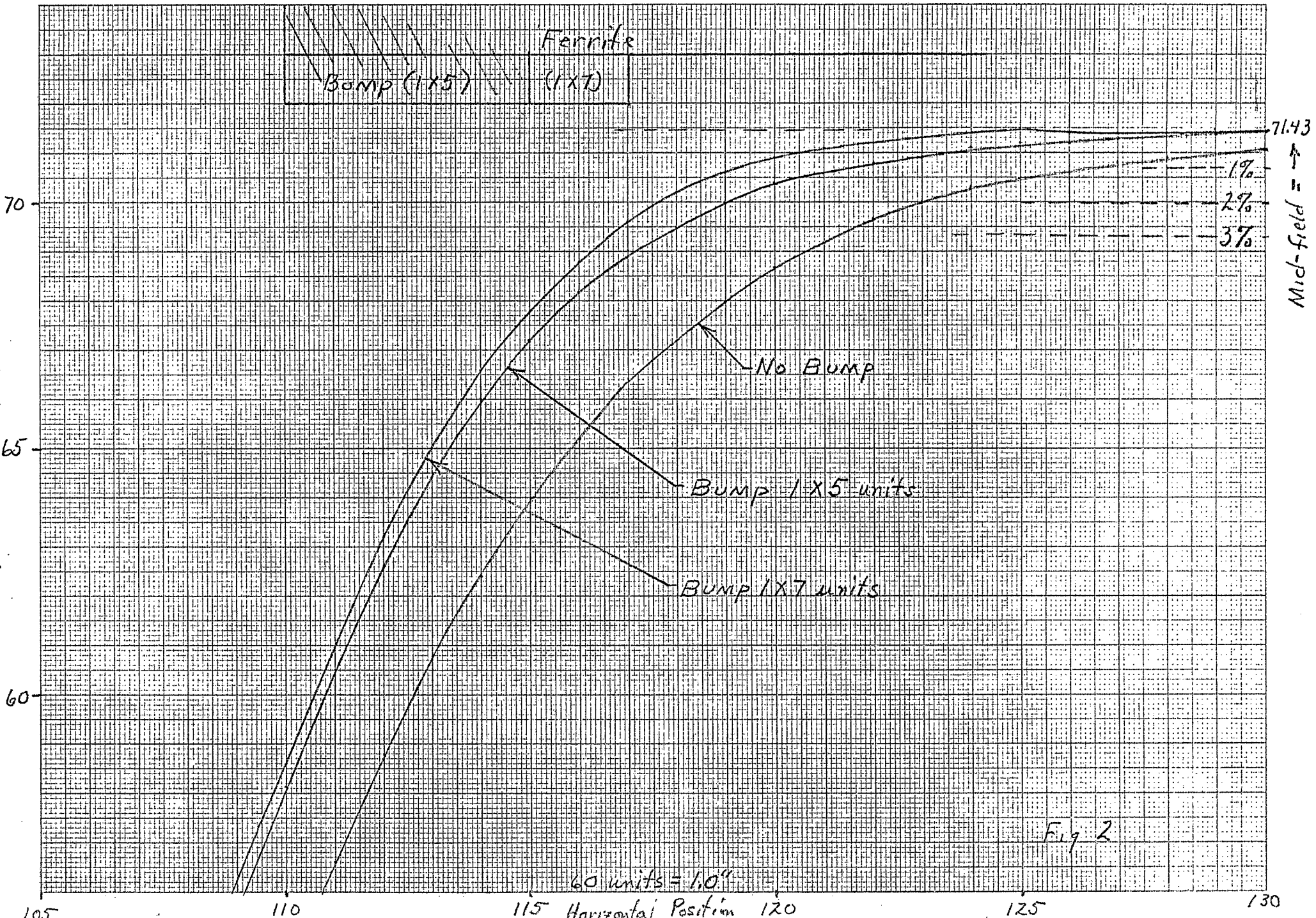
Table I

	Normalized Inductance	Change
Calculated with assumed 1/2 gap sq. fringe field	1.0	.0
Nose coil, h = 0	.939	−6.1%
Nose coil, h = .083 in.	.958	−4.2%
No nose coil, back core return	1.263	+26.3%

Figure 2 and 3 show on an expanded scale the field shape near the ferrite edge. Ferrite bumps of unit height are summarized in Figure 2. Better results are obtained with bumps two units high as shown in Figure 3. The optimum choice is a judgment. I can recommend either the set labeled (2+3) or the set (3+4). The latter set has a small overshoot, less than 1/2%, and extends the field edge relative to the core edge by 0.005 inches. The ferrite bump is a little wider (.042 in. against .003 in.) and thus a little stronger mechanically.

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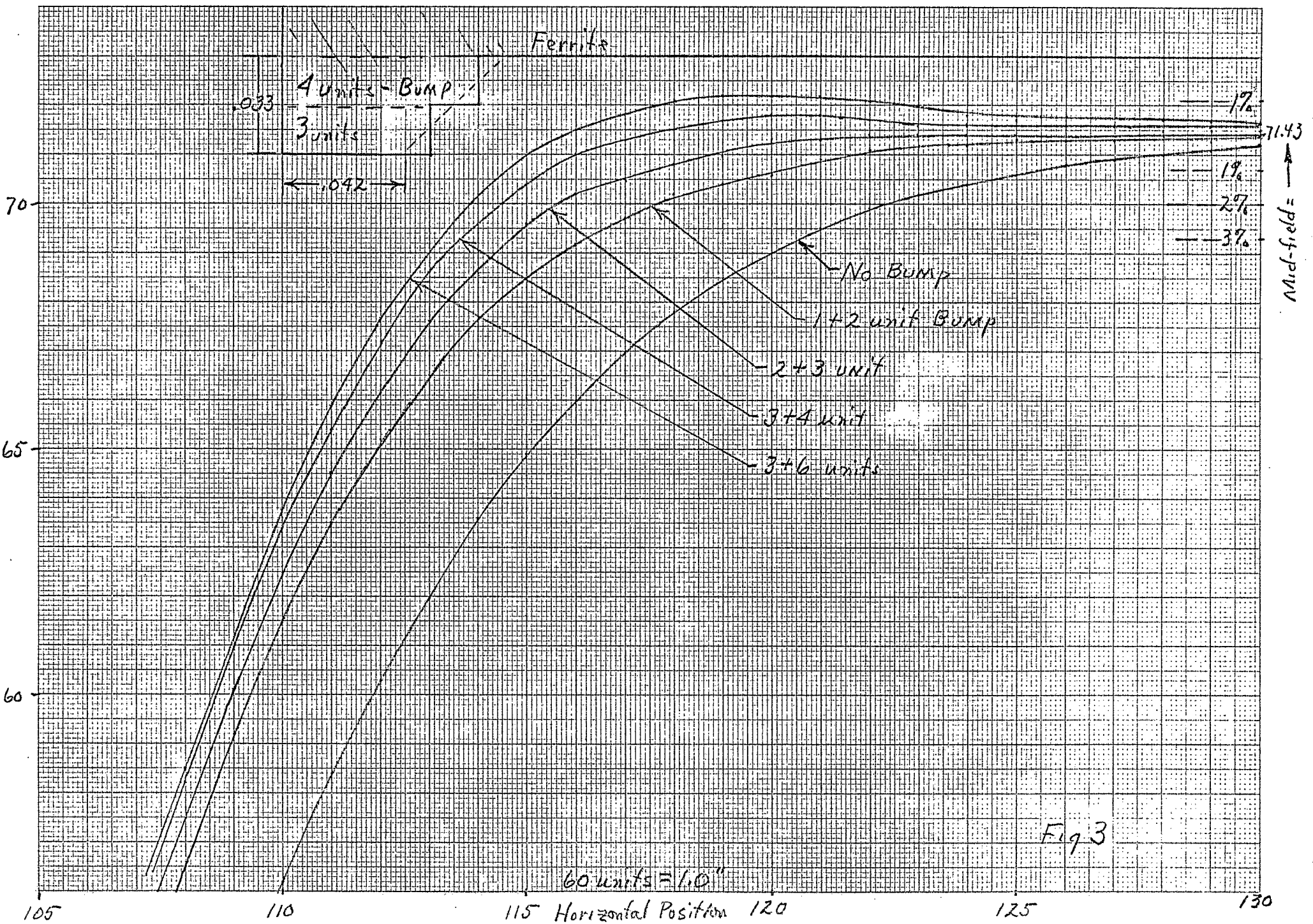   H. Weisberg
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Fig 1

Fig. 2

Fig. 3